This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Previously presented) A process for preparing a composite of nanocrystalline structure based on magnesium and at least one or several other elements or compounds known to absorb hydrogen and to be very few miscible with magnesium or its hydride during grinding, characterized in that it comprises:

a) subjecting magnesium or a magnesium-based compound known to absorb hydrogen, to a hydrogenation in order to obtain a hydride in the form of a powder;

b) mixing the so-obtained hydride in a powder form with the other element(s) or compound(s) or with a hydride of said other element(s) or compound(s) to obtain a mixture;

c) subjecting the so-obtained mixture to an intensive mechanical grinding in order to obtain a composite of nanocrystalline structure in the form of a hydride with an average crystal size between 0.1 nm and 100 nm; and, if required,

d) subjecting the composite obtained in step c) to a hydrogen desorption, with the proviso that said other element(s) or compound(s) or their hydride(s) is not Mg_2NiH_4.

2. (Previously presented) The process according to claim 1, characterized in that step a) is carried out with magnesium.

3. (Previously presented) The process according to claim 1, characterized in that step a) is carried out with a magnesium-based compound of the formula:

$$Mg_{1-x}A_x$$

wherein A is at least one element selected from the group consisting of Li, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Al, Y, Zr, Nb, Mo, In, Sn, O, Si, B, C, F and Be, and x is a number equal to or lower than 0.3.

4. (Previously presented) The process according to claim 1, characterized in that step a) is carried out with a magnesium-based compound of the formula:

$$(Mg_{2-z}Ni_{1+z})_{1-x}A_x$$

wherein A is at least one element selected from the group consisting of Li, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Al, Y, Zr, Nb, Mo, In, Sn, O, Si, B, C, F and Be, and x is a number equal to or lower than 0.3 and z is a number comprised between -0.3 to + 0.3.

5. (Previously presented) The process according to claim 1, characterized in that step b) is carried out with another element and said other element is selected from the group consisting of V, Ti, Fe, Co, Nb, Ca, Cs, Mn, Ni, Ca, Ce, Y, La, Pd, Hf, K, Rb, Rh, Ru, Zr, Be, Cr, Ge, Si, Li and their hydrides.

6. (Original) The process according to claim 5, characterized in that the other element is V.

7. (Original) The process according to claim 5, characterized in that the other element is Nb.

8. (Previously presented) The process according to claim 1, characterized in that step b) is carried out with another compound and said other compound is selected from the group consisting of $LaNi_5$, $MnNi_5$, $ZrMn_2$, ZrV_2, $TiMn_2$, Mg_2Ni and their hydrides except Mg_2NiH_4, the solid solutions of the formula $V_{1-y}Ti_y$ where y ranges from 0 to 1, $(V_{0.9}Ti_{0.1})_{0.95}Fe_{0.05}$ and the atmosphere alloys of Mg-Ti.

9. (Previously presented) The process according to claim 6, characterized in that in step b), the atomic or molar percentage of said other element in the mixture is equal to or lower than 10%.

10. (Previously presented) The process according to claim 9, characterized in that, in step b), the atomic percentage of said other element in the mixture is equal to 5%.

11. (Previously presented) The process according to claim 9 characterized in that, in step b), the atomic percentage of said other element in a mixture is equal to 3%.

12. (Previously presented) The process according to claim 1, characterized in that in step c), the mixture is subjected to an intensive mechanical grinding in a ball milling machine for a period of 5 to 20 hours.

13. (Withdrawn) The process according to claim 1, wherein the nanocomposite based on magnesium and one or more other elements or compounds known to absorb hydrogen has a very fine microstructure with activated interfaces.

14. (Cancelled)

15. (Previously presented) The process according to claim 7, characterized in that in step b), the atomic or molar percentage of said other element in the mixture is equal to or lower than 10%.

16. (Previously presented) The process according to claim 15, characterized in that, in step b), the atomic percentage of said other element in the mixture is equal to 5%.

17. (Previously presented) The process according to claim 15, characterized in that, in step b), the atomic percentage of said other element in a mixture is equal to 3%.